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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re U.S. National Stage Application of PCT/FI00/00640

SOININEN et al.

Group Art Unit: Not Yet Assigned

Appln. No.: Not Yet Assigned

Examiner: Not Yet Assigned

Filed: January 11, 2002

FOR: ACCESS CONTEXT MANAGEMENT FOR MACRO-LEVEL MOBILITY
MANAGEMENT REGISTRATION IN AN ACCESS NETWORK

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January 11, 2002

PRELIMINARY AMENDMENT

Hon. Commissioner of Patents
Washington, DC 20231

Sir:

Before beginning examination, kindly amend the above-identified application as

follows:

IN THE SPECIFICATION:

Please replace the original specification with the enclosed substitute specification,
which is in U.S. format with paragraph numbering.

On page 1 of the substitute specification, just after the title, please insert the following paragraph:

--This is the U.S. National Stage of PCT/FI00/00640, which was filed on July 11, 2000 in the English language.--

IN THE CLAIMS:

Please amend claims 1-21 as follows:

1. (Amended) A method of managing access network protocol context in an access system comprising a plurality of mobile nodes, access nodes serving said mobile nodes, a first gateway node for interfacing a first part of the access system with external networks, and a first mobility entity which is associated with said first gateway node and arranged to provide macro mobility management services to the mobile nodes while registered to a respective part of the access system, said method comprising

opening at least one access network protocol context at a first access node and the first gateway node in order to establish a connection between one of said plurality of mobile nodes and said first gateway node,

initiating a macro mobility registration over said access network connection between the mobile node and the first mobility entity,

monitoring at the first gateway node the macro mobility registration,

determining on the basis of the result of the registration that at least one access network protocol context is no longer necessary,

triggering a deletion of the unnecessary access network protocol context.

2. (Amended) A method as claimed in claim 1, comprising

determining at the first gateway node, in response to detecting a failure in said macro mobility registration, whether it is possible to retry the macro mobility registration or whether the registration has irrecoverably failed.

3. (Amended) A method as claimed in claim 1, comprising the gateway node sending a context deletion message to the first access node, when the macro mobility registration irrecoverably fails.

4. (Amended) A method as claimed in claim 3, comprising
deleting at the first access node the PDP context to the first gateway node in response
to receiving said context deletion message.

5. (Amended) A method as claimed in claim 4, comprising
deleting at the first access node the PDP context to the mobile node in response to
receiving said deletion message.

6. (Amended) A method as claimed in claim 1, wherein said registration is due to a
handover from a second gateway node to said first gateway node, the method comprising
further steps of
deciding at the first access node, in response to receiving a context deletion message
from the first gateway node, whether to maintain or recreate an old PDP context to an old
gateway node, or to delete the PDP context to the old gateway node and/or to the mobile
node.

7. (Amended) A method as claimed in claim 6, wherein
said decision is based on a cause value in said context deletion message, said cause value
indicating a cause for sending the context deletion message.

8. (Amended) A method as claimed in claim 1, wherein said macro mobility
management is Internet Protocol-type, or IP-type mobility management.

9. (Amended) A method as claimed in claim 1 in a radio access system, wherein said
access network protocol context comprises a packet protocol context .

10. (Amended) A method as claimed in claim 1, wherein said mobility entity associated with the gateway node is a foreign agent.

11. (Amended) An access system, comprising
a plurality of mobile nodes,
access nodes,
a first gateway node for interfacing said access system with external networks,
a first mobility entity which is associated with said first gateway node and arranged to provide macro mobility management services to the mobile nodes while registered to a respective part of the access system,
each mobile node being able to perform a macro mobility registration to the first mobility entity over a respective dedicated access network connection established by opening an access network protocol context at a first access node and the first gateway node,
the first gateway node being arranged to monitor the macro mobility registration, to trigger a deletion of any access network protocol context which is no longer necessary on the basis of the result of the registration.

12. (Amended) A system as claimed in claim 11, comprising
the first gateway node being arranged to determine, in response to detecting a failure in said macro mobility registration, whether it is possible to retry the macro mobility registration or whether the registration has irrecoverably failed.

13. (Amended) A system as claimed in claim 11, comprising the gateway node being arranged to send a context deletion message to the first access node, when the macro mobility registration irrecoverably fails.

14. (Amended) A system as claimed in claim 13, comprising first access node being arranged to delete the PDP context to the first gateway node and/or the PDP context to the mobile node in response to receiving said deletion message.

15. (Amended) A system as claimed in claim 11, comprising said registration being due to a handover from a second gateway node to said first gateway node, and said first access node being arranged to decide, in response to receiving a context deletion message from the first gateway node, whether to maintain or recreate an old PDP context to an old gateway node, or to delete the PDP context to the old gateway node and/or to the mobile node, based on a cause value in said context deletion message, said cause value indicating a cause for sending the context deletion message.

16. (Amended) A system as claimed in claim 11, wherein said macro mobility management is Internet Protocol-type, or IP-type mobility management, and wherein said mobility entity associated with the gateway node is a foreign agent.

17. (Amended) A system as claimed in claim 11 in a radio access system, wherein said access network protocol context comprises a packet protocol context.

18. (Amended) A gateway node for an access system which comprises a plurality of mobile nodes, access nodes and a first mobility entity which is associated with said first

gateway node and arranged to provide macro mobility management services to the mobile nodes, each mobile node being able to perform a macro mobility registration to the first mobility entity over a respective dedicated access network connection established by opening an access network protocol context at a first access node and the first gateway node, said first gateway node being arranged to monitor the macro mobility registration and to trigger a deletion of any access network protocol context which is no longer necessary on the basis of the result of the registration.

19. (Amended) A gateway node as claimed in claim 18, comprising said gateway node being arranged to determine, in response to detecting a failure in said macro mobility registration, whether it is possible to retry the macro mobility registration or whether the registration has irrecoverably failed.

20. (Amended) A gateway node as claimed in claim 18, comprising said gateway node being arranged to send a context deletion message to the first access node, when the macro mobility registration irrecoverably fails.

21. (Amended) A gateway node as claimed in claim 18, comprising said gateway node being integrated into the same physical node with said access node.

See the attached Appendix for changes to effect the above claims.

REMARKS

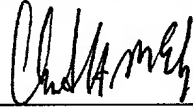
A substitute specification in U.S. format has been enclosed to replace the original PCT specification. The undersigned submits and certifies that no new matter is added by the submission of the substitute specification. A marked-up substitute specification will follow shortly.

Claims 1-21 are pending in this National Stage application. By this amendment, these claims were amended to conform to U.S. practice, *e.g.*, to remove reference numerals and multiple dependencies. No new material was added to either the specification or to the claims.

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached Appendix is captioned **"VERSION WITH MARKINGS TO SHOW CHANGES MADE"**.

Respectfully submitted,

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Enclosures: Appendix
Substitute Specification

APPENDIX

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

Priority claim is recited in new paragraph just after the title on page 1.

IN THE CLAIMS:

1. (Amended) A method of managing access network protocol context in an access system comprising a plurality of mobile nodes[MS/MN]}, access nodes [SGSN1, SGSN2]] serving said mobile nodes, a first gateway node [(GGSN1)] for interfacing a first part [(RAN1)] of the access system with external networks [(12)], and a first mobility entity [(FA1)] which is associated with said first gateway node [(GGSN1)] and arranged to provide macro mobility management services to the mobile nodes [(MS/MN)] while registered to a respective part [(RAN1)] of the access system, said method comprising

opening at least one access network protocol context at a first access node and the first gateway node in order to establish a connection between one of said plurality of mobile nodes [(MS/MN)] and said first gateway node,

initiating a macro mobility registration over said access network connection between the mobile node and the first mobility entity,

[characterized by further steps of]

monitoring at the first gateway node the macro mobility registration,

determining on the basis of the result of the registration that at least one access network protocol context is no longer necessary,

triggering a deletion of the unnecessary access network protocol context.

2. (Amended) A method as claimed in claim 1, [characterized by] comprising determining at the first gateway node, in response to detecting a failure in said macro mobility registration, whether it is possible to retry the macro mobility registration or whether the registration has irrecoverably failed.

3. (Amended) A method as claimed in claim 1[or 2], [characterized by] comprising the gateway node sending a context deletion message to the first access node, when the macro mobility registration irrecoverably fails.

4. (Amended) A method as claimed in claim[s] 3, [characterized by] comprising deleting at the first access node the PDP context to the first gateway node in response to receiving said context deletion message.

5. (Amended) A method as claimed in claim[s] 4, [characterized by] comprising deleting at the first access node the PDP context to the mobile node in response to receiving said deletion message.

6. (Amended) A method as claimed in [any one of claims 1 to 5]claim 1, [characterized by] wherein said registration is due to a handover from a second gateway node to said first gateway node, the method comprising further steps of deciding at the first access node, in response to receiving a context deletion message from the first gateway node, whether to maintain or recreate an old PDP context to an old gateway node, or to delete the PDP context to the old gateway node and/or to the mobile node.

7. (Amended) A method as claimed in claim 6, [characterized by] wherein said decision is based on a cause value in said context deletion message, said cause value indicating a cause for sending the context deletion message.

8. (Amended) A method as claimed in [any one of claims 1 to 7] claim 1, [characterized in that] wherein said macro mobility management is Internet Protocol-type, or IP-type mobility management.

9. (Amended) A method as claimed in [any one of claims 1 to 8] claim 1 in a radio access system, [characterized in that] wherein said access network protocol context comprises a packet protocol context .

10. (Amended) A method as claimed in [any one of claims 1 to 9] claim 1, [characterized in that] wherein said mobility entity associated with the gateway node [(GGSN2)] is a foreign agent [(FA2)].

11. (Amended) An access system, comprising
a plurality of mobile nodes [(MS/MN)],
access nodes [(SGSN1, SGSN2)],
a first gateway node [(GGSN1)] for interfacing said access system with external networks [(11)],
a first mobility entity [(FA1)] which is associated with said first gateway node [(GGSN1)] and arranged to provide macro mobility management services to the mobile nodes [(MS/MN)] while registered to a respective part [(RAN1)] of the access system,

each mobile node being able to perform a macro mobility registration to the first mobility entity over a respective dedicated access network connection established by opening an access network protocol context at a first access node and the first gateway node, [characterized by]

the first gateway node being arranged to monitor the macro mobility registration, to trigger a deletion of any access network protocol context which is no longer necessary on the basis of the result of the registration.

12. (Amended) A system as claimed in claim 11, [characterized by] comprising the first gateway node being arranged to determine, in response to detecting a failure in said macro mobility registration, whether it is possible to retry the macro mobility registration or whether the registration has irrecoverably failed.

13. (Amended) A system as claimed in claim 11 [or 12], [characterized by] comprising the gateway node being arranged to send a context deletion message to the first access node, when the macro mobility registration irrecoverably fails.

14. (Amended) A system as claimed in claim 13, [characterized by] comprising first access node being arranged to delete the PDP context to the first gateway node and/or the PDP context to the mobile node in response to receiving said deletion message.

15. (Amended) A system as claimed in [any one of claims 11 to 14] claim 11, [characterized by] comprising said registration being due to a handover from a second gateway node to said first gateway node, and said first access node being arranged to decide, in response to receiving a context deletion message from the first gateway node, whether to

maintain or recreate an old PDP context to an old gateway node, or to delete the PDP context to the old gateway node and/or to the mobile node, based on a cause value in said context deletion message, said cause value indicating a cause for sending the context deletion message.

16. (Amended) A system as claimed in [any one of claims 11 to 15] claim 11, [characterized in that] wherein said macro mobility management is Internet Protocol-type, or IP-type mobility management, and wherein said mobility entity associated with the gateway node [GGSN2]) is a foreign agent [(FA2)].

17. (Amended) A system as claimed in [any one of claims 11 to 16] claim 11 in a radio access system, [characterized in that] wherein said access network protocol context comprises a packet protocol context.

18. (Amended) A gateway node for an access system which comprises a plurality of mobile nodes [(MS/MN)], access nodes [(SGSN1, SGSN2)] and a first mobility entity [(FA1)] which is associated with said first gateway node [(GGSN1)] and arranged to provide macro mobility management services to the mobile nodes [(MS/MN)], each mobile node being able to perform a macro mobility registration to the first mobility entity over a respective dedicated access network connection established by opening an access network protocol context at a first access node and the first gateway node, [characterized by] said first gateway node being arranged to monitor the macro mobility registration and to trigger a deletion of any access network protocol context which is no longer necessary on the basis of the result of the registration.

19. (Amended) A gateway node as claimed in claim 18, [characterized by] comprising said gateway node being arranged to determine, in response to detecting a failure in said macro mobility registration, whether it is possible to retry the macro mobility registration or whether the registration has irrecoverably failed.

20. (Amended) A gateway node as claimed in claim 18 [or 19], [characterized by] comprising said gateway node being arranged to send a context deletion message to the first access node, when the macro mobility registration irrecoverably fails.

21. (Amended) A gateway node as claimed in claim 18, [19 or 20,] [characterized by] comprising said gateway node being integrated into the same physical node with said access node.